

Appl. No. 09/642,612
Amdt. dated October 26, 2004
Reply to Office Action of August 12, 2004

PATENT

Amendments to the Claims:

This listing of claims will replace all prior versions, and listings of claims in the application:

Listing of Claims:

Claims 1-7 (canceled)

Claim 8 (currently amended) An apparatus for receiving a plurality of packets having the same contents sent from another apparatus through a plurality of physical lines that connect between said apparatus and said another apparatus, the packets received from one of said plurality of physical lines having identifier information unique to each packet, said apparatus comprising:

a line controller that controls packet flow over said plurality of physical lines;
a packet information storage that stores identifier information unique to each packet, said identifier information appended to packets flowing over said plurality of physical lines; and

a line receiver unit, connected by said plurality of physical lines, receiving the plurality of packets having the same contents sent from said another apparatus through said plurality of physical lines; said line receiving unit operable to monitor packets received from said plurality of physical lines, and confirm whether identifier information of said packets has been stored in said packet information storage, and when said identifier information of said received packets has not been stored therein, causes said identifier information of said received packets to be stored in said packet information storage.

Claim 9 (original) The receiving apparatus of claim 8, wherein said line controller controls said plurality of physical lines in accordance with a first layer (physical layer) of an OSI reference model.

Claim 10 (previously presented) The receiving apparatus of claim 8, wherein

Appl. No. 09/642,612
Amdt. dated October 26, 2004
Reply to Office Action of August 12, 2004

PATENT

when said identifier information of said received packets has not been stored, said line receiver stores said identifier information of said received packets in said packet information storage; thereupon forwards said received packets; and deletes said identifier information.

Claim 11 (original) The receiving apparatus of claim 10, wherein:
said line receiver forwards said received packets in accordance with a second layer (data link layer) of an OSI reference model.

Claim 12 (original) The receiving apparatus of claim 10, further comprising:

a protocol processor that receives said forwarded packets whose identifier information has been deleted, from said line receiver and thereupon effects a protocol process in at least a third layer of an OSI reference model on said packets.

Claim 13 (canceled)

Claim 14 (currently amended) An apparatus for receiving a plurality of packets having the same contents sent from another apparatus through a plurality of physical lines that connect between said apparatus and said another apparatus, comprising:

a line controller that controls packet flow over said plurality of physical lines;
a plurality of mode flags, each mode flag associated with one of said plurality of physical lines, and for respectively storing either a primary or a secondary mode therein;
a plurality of storage areas that store received packets; and
a plurality of line receivers receiving the plurality of packets having the same contents sent from said another apparatus through said plurality of physical lines; wherein at least one of said plurality of line receivers delivers received packets from one of said plurality of storage areas for forwarding if a mode flag corresponding to said at least one of said plurality of line receivers has a primary mode stored therein.

Appl. No. 09/642,612
Amdt. dated October 26, 2004
Reply to Office Action of August 12, 2004

PATENT

Claim 15 (original) The apparatus of claim 14, wherein said line controller controls said plurality of physical lines in a first layer (physical layer) of an OSI reference model.

Claim 16 (original) The receiving apparatus of claim 14, wherein each of said plurality of line receivers abandons received packets if a mode flag corresponding to said at least one of said plurality of line receivers has a secondary mode stored therein.

Claim 17 (currently amended) The apparatus of claim 16, wherein: said a protocol processor that performs a protocol process in a third layer or higher of an OSI reference model.

Claim 18 (original) The receiving apparatus of claim 14, further comprising:

a receiving line switching unit that monitors a presence of a failure of one of said plurality of physical lines corresponding to one of said plurality of mode flags storing a primary mode therein, and when a failure is detected, changes said one of said plurality of mode flags storing said primary mode therein to a secondary mode; and changes another of said plurality of mode flags storing said secondary mode therein to a primary mode.

Claim 19 (original) The receiving apparatus of claim 14, further comprising:

a receiving line switching unit that monitors a presence of a failure of one of said plurality of physical lines corresponding to one of said plurality of mode flags storing a primary mode therein, and when a failure is detected, changes said one of said plurality of mode flags storing said primary mode therein to a secondary mode; and changes another of said plurality of mode flags storing said secondary mode therein to a primary mode; and thereupon

compares each received packet stored in said received packet storage area corresponding to said mode flag changed to said secondary mode and each received packet

Appl. No. 09/642,612
Amdt. dated October 26, 2004
Reply to Office Action of August 12, 2004

PATENT

stored in said received packet storage area corresponding to said mode flag changed to said primary mode; and receives a received packet equivalent to each packet lost due to said failure.

Claim 20 (original) The receiving apparatus of claim 14, further comprising:

a receiving line switching unit that monitors a presence of a failure of one of said plurality of physical lines corresponding to one of said plurality of mode flags storing a primary mode therein, and when a failure is detected, changes said one of said plurality of mode flags storing said primary mode therein to a secondary mode; and changes another of said plurality of mode flags storing said secondary mode therein to a primary mode; and thereupon

compares each received packet stored in said received packet storage area corresponding to said mode flag changed to said secondary mode and each received packet stored in said received packet storage area corresponding to said mode flag changed to said primary mode.

Claims 21-25 (canceled)

Claim 26 (previously presented) An apparatus for transmitting and receiving packets to and from another apparatus through said plurality of physical lines that connect between said apparatus and said another apparatus, said apparatus comprising:

a line controller for controlling said plurality of physical lines;

a line transmitting unit that prepares packets with identifier information added thereto, said identifier information unique to each of the packets, said packets prepared in association with a number of said plurality of physical lines; said line transmitting unit operative to transmit packets having the same contents to said plurality of physical lines;

a packet information storage that stores identifier information unique to each of said received packets, said identifier information having been added to said packets from another apparatus connected by said plurality of physical lines; and

at least one line receiver that monitors received packets; and responsive to a received packet, confirms whether identifier information of a received packet has been stored in

Appl. No. 09/642,612
Amdt. dated October 26, 2004
Reply to Office Action of August 12, 2004

PATENT

said packet information storage; and when identifier information having the same contents as that of said received packets has not been stored therein, allowing said packet information storage to store said identifier information of said received packets therein.

Claim 27 (original) The apparatus of claim 26, wherein said line controller controls said plurality of physical lines in a first layer (physical layer) of an OSI reference model.

Claim 28 (currently amended) A transmitting and receiving apparatus for exchanging packets with another apparatus through a plurality of physical lines that connect between said apparatus and said another apparatus, comprising:

a line controller for controlling said plurality of physical lines;

a line transmitting unit that prepares a plurality of packets having an identical content with identifier information unique to each packet added thereto, in association with a quantity of said plurality of physical lines, and transmits said plurality of packets having identical content to said plurality of physical lines;

mode flags associated with each of said plurality of physical lines, said mode flags operative to store either a primary or a secondary mode; and

line receivers that receive a plurality of packets having identical content from the plurality of physical lines, and that deliver packets received from said plurality of physical lines to a protocol processor when said mode flags store a primary mode therein, said line receivers further operative to abandon received packets when said mode flags store a secondary mode therein.

Claim 29 (original) The apparatus of claim 28, wherein said line controller controls said plurality of physical lines in a first layer (physical layer) of an OSI reference model.

Claims 30-34 (canceled)

Appl. No. 09/642,612
Amdt. dated October 26, 2004
Reply to Office Action of August 12, 2004

PATENT

Claim 35 (previously presented) The receiving apparatus of claim 8, wherein said identifier information comprises a FCS (Frame Check Sequence) value of an Ethernet frame.

Claim 36 (previously presented) The receiving apparatus of claim 8, wherein said identifier information comprises a FCS value of an IEEE (Institute of Electrical and Electronics Engineers) 802.3 frame.

Claim 37 (previously presented) The receiving apparatus of claim 8, wherein said identifier information comprises a FCS value of an IEEE802.5 Token Ring frame.

Claim 38 (previously presented) The receiving apparatus of claim 8, wherein said identifier information comprises a FCS value of an ANSI (American National Standard Institute) X3T9 FDDI (Fiber Distributed Data Interface) frame.

Claim 39 (original) The receiving apparatus of claim 8, wherein said identifier information comprises a CRC (Cyclic Redundancy Check) value of an ANSI X3T9 Fiber Channel frame.

Claim 40 (canceled)

Claim 41 (currently amended) A receiving apparatus for receiving a plurality of packets having the same content from another apparatus through a plurality of physical lines, the packets received from one of the plurality of physical lines having identifier information unique to each packet, comprising:

a packet information storage for storing therein identifier information unique to each packet, which is added to said received packets; and

at least one line receiver receiving the plurality of packets having the same contents sent from said another apparatus through said plurality of physical lines, for monitoring the received packets and when the received packets are confirmed, confirming whether the identifier information of the received packets are stored in the packet information storage, and

Appl. No. 09/642,612
Amtd. dated October 26, 2004
Reply to Office Action of August 12, 2004

PATENT

when the identifier information having the same contents as those of the received packets are not stored therein, allowing said packet information storage to store the identifier information of the received packets therein.

Claims 42-55 (canceled)